STUDIES ON AUSTRALIAN MOLLUSCA.

Part IV.

(*Continued from Vol.* xxv., *p.* 732.)

By C. Hedley, F.L.S.

(Plate ii.)

Flammulina gayndahensis, Brazier.

Helix (Thalassia) Gayndahensis, Braz., Proc. Linn. Soc. N. S. Wales, i. 1875, p. 2.

(Plate ii., figs. 17-19.)

An example from the original lot has supplied the opportunity of illustrating this hitherto unfigured shell. It measures: height, 4 mm.; major diameter, 7 mm.; minor diameter, 6 mm. Without some knowledge of the anatomy, its classification cannot be certain. The consideration of shell characters suggests to me that its place is next *F. delta*, Pfr., as a second member of the subgenus called *Hedleyoconcha* by Pilsbry.*

Tritonium sinense, Reeve.

Tryon, Man. Conch. iii., p. 20, pl. xi., fig. 85.

This tropical species appears to have escaped notice as an inhabitant of the coast of N. S. Wales. I have seen an adult specimen taken at the Black Rocks, near Ballina, N. S. Wales.

A near ally, *T. caudatum*, Reeve, has already been recorded by Angas† from Port Stephens and near the mouth of the Macleay

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* Pilsbry, Guide to the Study of Helices, 1894, p. 18.

† Angas, P.Z.S., 1877, p. 179.

River. I have seen an adult shell from the Black Rocks, and a young dead specimen was lately found at Balmoral Beach by Mr. J. J. Walker, R.N.

MANGILIA ALTICOSTATA, Sowerby.

Sowerby, Proc. Malacol. Soc. ii., 1896, p. 31, pl. iii., fig. 16.

This species has hitherto been known only from St. Vincent's Gulf, S. Australia. I have lately recognised it in a single beach shell collected by Mr. J. Brazier in the dyke-trough at Hunter's Beach, Middle Harbour.

SCALA MINUTULA, Tate & May.

Tate & May, Trans. Roy. Soc. S. Australia, 1900, p. 95.

This species has been found in N. S. Wales by Mr. H. L. Kesteven, who has shown me an example which he collected at the North Head of Botany Bay. He has since generously presented his specimen to the Australian Museum.

ODONTOSTOMIA VARIANS, Tate & May.

Tate & May, Trans. Roy. Soc. S. Australia, 1900, p. 97.

An example of this species which I collected on Balmoral Beach, Middle Harbour, was identified for me by Prof. Tate.

LIOTIA VENUSTA, n.sp.

(Plate ii., figs. 1-3.)

Shell flattened, widely umbilicate, solid, glossy, white. Whorls four and a-half. Upper ones smooth; the last two with one keel at the periphery and another at a third of the distance between that and the suture; on the last whorl these are beaded (32 beads on the periphery), but on the penultimate they are plain. On the base a keel follows the rim of the umbilicus, and at equal distances three others are disposed between that and the periphery. For minor sculpture there are raised spiral threads between the suture and upper beaded keel. The spaces between the other keels are latticed by oblique threads in the line of

growth, which appear again within the umbilicus. Aperture oblique, ovate; lip very little thickened and expanded. Major diam., 4·9; minor diam., 3·8; height, 2·2 mm.

Hab.—Darnley Island, Torres Straits. One specimen taken by Mr. J. Brazier in 30 fathoms.

Type.—To be preserved in the Australian Museum.

This species is not like the typical *Liotia*; it possibly belongs to *Microtheca*, a genus not sufficiently elaborated by its author for satisfactory use.

Liotia devexa, n.sp.

(Plate ii., figs. 4-6.)

Shell turbinate, whorls in transverse section nearly square, widely umbilicate, very solid, dull. Colour creamy white, whorls four, the upper two unsculptured, the last descending steeply and suddenly. The whole surface is densely covered by fine, close, radiating threads. Periphery flattened, with a keel at the upper and lower angles, the superior crenulated. Outside the deeply impressed suture runs a row of denticules. Base flattened, the abrupt margin of the aperture scalloped. Aperture semilunate, very oblique, with two massive lips, one within the other. Major diam., 4·5; minor diam., 3·5; height, 3·3 mm.

Hab.—Torres Straits; dredged by Mr. J. Brazier, in 12 fathoms.

Type.—To be preserved in the Australian Museum.

Teinostoma vesta, n.sp.

(Plate ii., figs. 14-16.)

Shell subdiscoidal, solid, smooth, glossy, white, and widely umbilicate. Whorls four, parted by a furrowed suture, last whorl broadened near the aperture, above ascending on the previous whorl, below with incipient transverse ribs. Spire a little elevated. Umbilicus infundibuliform, sharply angled at the margin. Aperture oval, a little thickened within. Major diam., 3·15; minor diam., 2·3; height, 1·5 mm.

Hab.—Darnley Island, Torres Straits; several examples dredged by Mr. J. Brazier, in 30 fathoms.

Type.—To be preserved in the Australian Museum.

Cyllene lactea, Adams & Angas.

Adams & Angas, P.Z.S., 1863, p. 422; 1867, p. 191.

(Plate ii., fig. 10.)

A drawing is now presented of this hitherto unfigured species. The original is 13 mm. in length and 6·5 in breadth. It was identified by Mr. Brazier, and was dredged by him in 8 fathoms off the inner North Head, Sydney Harbour. The colour is not always as described by the specific name. Some shells are marbled with pale brown, and have below the suture alternate white and dark brown spaces.

Cantharidus decoratus, Philippi.

This common shell varies a little;* some specimens are more sharply keeled and some are broader in proportion to their height than others; the spiral lines of granules differ in their development, and the colouration is not always the same. Owing partly to this, but chiefly to insufficient material, it seems to me that several names have been applied to it. After diligent study I can find no essential difference between the descriptions and figures in the Conchylien Cabinet of *Trochus decoratus* (p. 59), *T. fragum* (p. 257), and *T. pyrgos* (p. 297), all of Philippi. Indeed, my chief difficulty in uniting these is to believe that so careful an author could thus err. No subsequent conchologist has recognised all three species. For instance, Smith sees *T. decoratus* in the Sydney shell, but refers to *fragum* as only known to him in literature; again, Pilsbry recognises the Sydney shell as *T. pyrgos*, but *T. decoratus* is for him a name in books.

The description of *Thalotia zebrides* by A. Adams is without measurement or locality, and is quite useless for discrimination. Angas, doubtless informed by Adams, thus determined and

* As noticed by Reeve, Conch. Icon. xiv., 1863, *Ziziphinus*, Pl. v., f. 36.

redescribed the common Sydney shell.* Pilsbry doubtfully subordinates *T. zebrides* to *Cantharidus pyrgos*.†

These names appeared in the following order:—

Trochus decoratus, Philippi, Zeitsch. f. Mal., July, 1846, p. 102. Locality unknown; from Gruner's collection.

Trochus fragum, Philippi, Zeitsch. f. Mal., 1848, p. 106. Locality unknown; also from Gruner's collection.

Trochus pyrgos, Philippi, Zeitsch. f. Mal., 1849, p. 189. Locality Australia; from Hanley's collection.

Thalotia zebrides, A. Ad., P.Z.S., 1851, p. 173. Locality unknown.

Canthiridus decoratus, Ad. & Ang. (P.Z.S. 1864, p. 37), is identified by Prof. Tate as *Gibbula tiberiana*, Crosse, 1863. It is submitted that the different rendering of the generic name of that species permits *Cantharidus decoratus*, Philippi, to be used for the Sydney shell.

Cuspidaria latesulcata, Ten. Woods.

Neæra latesulcata, Woods, P.L.S. N.S.W. ii., 1877 (1878), pp. 123, 124.

(Plate ii., figs. 11-13.)

That an illustration of this hitherto unfigured species might be supplied, Dr. J. C. Cox has kindly lent me his original series studied by the Rev. J. T. Woods. The valve represented is 31 mm. long. *C. latesulcata* was taken in Torres Straits by Prof. A. C. Haddon.‡

Smith, who writes the name, *N. latisulcata*, marks the species as one he personally examined and includes it in his section A. or *Neæra* proper.§

Dall has pointed out that because *Neæra* is preoccupied in entomology, *Cuspidaria* must necessarily be adopted.‖

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* Angas, P.Z.S., 1867, p. 215.

† Pilsbry, Man. Conch. xi., p. 144.

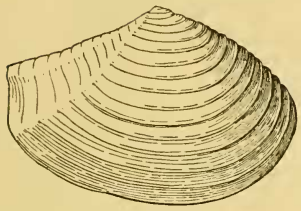
‡ Melvill & Standen, Journ. Linn. Soc. Zool. xxvii., 1899, p. 202.

§ Smith, Chall. Report, Lamellibranchiata, 1885, p. 35.

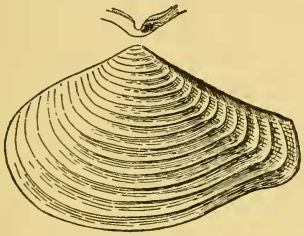
‖ Dall, Bull. Mus. Comp. Zool. xii., p. 292.

CUSPIDARIA TASMANICA, Ten. Woods.

T. Woods, Proc. R. Soc. Tasmania, 1875, p. 27.



For comparison with the foregoing species I include illustrations of this hitherto unfigured species, derived from an authentic specimen kindly lent to me by the Rev. H. D. Atkinson. (Fig. 20).



CUSPIDARIA TASMANICA.
Fig. 20.

LIMA BRUNNEA, n.sp.

(Plate ii., figs. 7-9.)

Shell thin, translucent, small, shaped like an axehead, with no gape, very inequilateral. Posteriorly the shell is truncate for almost the whole height, the truncated portion being sharply and deeply infolded. A curve of half a circle is approximately described by the ventral and anterior margin. Colour, pale brown. Sculpture: the whole surface is evenly covered by fine, close, radiating riblets, which are microscopically beaded, diverge from a median parting and are occasionally disjointed by concentric growth lines. Cardinal area triangular, overhung by the incurved beak and sharply defined by a ridge above. Hinge line short. Auricles almost obsolete, cartilage narrow, in an obliquely descending, shallow sulcus, which barely undulates the hinge margin. Inside polished, faintly tinged with purple; the margins denticulated by the radiating riblets. Height, 8 mm.; length, 6 mm.; breath of conjoined valves, 4 mm.

Hab.—Only known within Sydney Heads; dredged alive in 8 fathoms off Green Point, Watson's Bay, by Mr. J. Brazier; found dead on Chinaman's Beach, Middle Harbour, by myself, and at the inner South Head by Mr. H. L. Kesteven.

Type.—To be preserved in the Australian Museum.

I have had the pleasure of showing this remarkable little shell to Prof. Tate, who confirms me in regarding it as new. The feeble ligament and tightly closed valves suggest to me that this Lima is no swimmer.

On the Challenger Station, 164 B.

One of the Australian "Stations" of the cruise of H.M.S. *Challenger* is known as 164 B. It is situated a little distance east of Sydney in a depth of 410 fathoms. Here the expedition is reputed to have obtained a quantity of shells. Most are known from this haul alone.

Of these are:—*Neæra angasi*, *Lima murrayi*, *L. australis*, *Pecten challengeri*, *Nucula umbonata*, *N. dilecta*, *Tellimya subacuminata*, *Solarium atkinsoni*, *Scala distincta*, *Mitra miranda*, *Marginella carinata*, *M. brazieri*, *Cancellaria exigua*, *Pleurotoma challengeri*, *P. crossei*, *P. hoylei*, *P. watsoni*, *Odostomia fischeri*, *O. consanguinea*, *O. constricta*, *Bulla incommoda*, *Cylichna ordinaria* and *Lepeta alta*, all of E. A. Smith; *Trochus glyptus*, *Trophon carduelis*, *Fusus pagodoides* and *Nassaria campyla*, of R. B. Watson; *Turritella smithiana* and *T. crenulata* of Miss J. Donald.

Except for their presence in this haul the remainder of the species are known only from the North Atlantic Ocean, namely:—*Rissoa deliciosa*, Jeffreys; *Dentalium ensiculus*, Jeffreys; *D. panormitanum*, Chenu; *Cuspidaria teres*, Jeffreys; *Poromya neæroides*, Seguenza; *Cadulus propinquus*, Sars (or *C. curtus*, Jeffreys); *Dentalium capillosum*, Jeffreys; *Scaphander gracilis*, Watson; *Scissurella crispata*, Fleming; and *Seguenzia carinata*, Jeffreys.

Mr. E. A. Smith, who has dealt with this collection, remarks on it as follows:—"The specimens in question were picked out of samples of sea-bottom, which have been examined since the reports on the Gasteropoda and Lamellibranchiata by the Rev. R. Boog Watson and myself respectively were published. Mr.

Watson, who examined the Gasteropods, questioned the correctness of the locality from the presence of these Atlantic forms, and was inclined to believe that some mistake must have occurred. I also at first held the same view; but as Dr. Murray is convinced that no such error in the locality could possibly exist, I feel bound to withdraw that opinion."*

Probably most naturalists will fail to reconcile the facts with the conclusion quoted. Personally I cannot believe that an extensive series of marine shells could be taken in the neighbourhood of Sydney, which on the one hand should contain no Pacific species, but on the other have so large a proportion as one quarter of North Atlantic forms. A consultation of the "Summary of Results" of the Challenger expedition, strengthens the presumption that these shells are foreign to Australian seas. For it is written (i., p. 574) that at station 164 B., the operations consisted of sounding and putting over the trawl which came up "with a few specimens." In fact, the dredge was not put down at all. If the record of these specimens be correct, then one of the most profitable hauls of the voyage, rich in species and exceptionally rich in individuals, was made without using a dredge and appeared to the officer-in-charge as "a few specimens."

With reference to *D. ensiculus*, Pilsbry† writes:—"Taking into account the association of species of other genera, it seems to us quite incredible that these forms actually occurred at the station alleged. It is more likely that a locality label became misplaced."

Following this suggestion, it occurred to me that "164 B." might be a mistaken label for "64." Examination of the record of the latter station gives some support to this hypothesis. For Challenger Station 64 is in mid-Atlantic, between Bermuda and the Azores, with a depth of 2,700 fathoms. Here the dredge was put down "to get a good sample of the

* E. A. Smith, Proc. Malac. Soc. i., 1894, pp. 59, 60.

† Pilsbry, Man. Conch. xvii. p. 122.

bottom" and "about a cwt. of ooze" was secured.* I can find no further history of this hundredweight of mud in the Challenger publications, and I venture to suggest it as a probable origin of the 164 B. shells. Every reason against the Australian habitat of these shells becomes an argument in favour of their Atlantic habitat. Firstly, my hypothesis satisfies the claim made by *Rissoa deliciosa* and following ten species, to transfer the whole collection from the Pacific to the Atlantic; secondly, the field books of the expedition show that the Atlantic Station 64 yielded a great haul but no published results; whereas the Pacific Station 164 B. gave an insignificant haul with great published results; thirdly, it is expressly stated by Smith that the 164 B. shells "were picked out of samples of sea-bottom;" the Atlantic sample was a cwt. of ooze, the Pacific sample was what returned upon the sounding lead.

This reasoning may or may not be sufficient grounds for incorporating the 164 B. shells in the Western-North Atlantic fauna, but I submit that it justifies the elimination of the series from the Australian fauna.

The period of disturbed records includes a previous haul. At Station 163 A., off Twofold Bay, N. S. Wales, depth 120-150 fathoms, the *Challenger* trawled several large shells of which no notice appeared in the subsequent reports. Angas, on Brazier's information, mentions† that *Murex cervicornis*, Lamarck; *Cypraea umbilicata*, Sowerby; *Voluta papillosa*, Swainson; and others were taken there.

As corroborative evidence of the correctness of the locality of these 164 B. shells, Smith cites the supposed finding alive of the Mediterranean species *Euthria cornea* by Mr. R. C. Rossiter at Wagap, New Caledonia. I wrote to Mr. Rossiter to inquire about this and he replied:—10th February, 1901, "that he had *not* found it alive, but had recived it from a correspondent." A

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* Summary of Results, Chall. Ex. i., 1895, pp. 252-3.

† Angas, P.Z.S., 1877, p. 179.

French military post is stationed at Wagap and the soldiers there come straight from Marseilles. The inference is obvious.

EXPLANATION OF PLATE II.

Figs. 1-3.—*Liotia venusta*, Hedley; from different aspects.
Figs. 4-6.—*Liotia devexa*, Hedley; from different aspects.
Figs. 7-9.—*Lima brunnea*, Hedley; from two aspects with details of hinge.
Fig. 10.—*Cyllene lactea*, Adams and Angas.
Figs. 11-13—*Cuspidaria latesulcata*, Ten. Woods; from different aspects.
Figs. 14-16—*Teinostoma vesta*, Hedley; from different aspects.
Figs. 17-19—*Flammulina gayndahensis*, Brazier; from different aspects